Leveraging Location Based Services for Revenue Generating IVR Applications

Whitepaper

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1 Abstract

Organizations in virtually any industry can streamline operations and maximize revenues by utilizing IVR applications. Many organizations view IVRs as being only leveraged for simple call handling, and overlook the potential revenue gains from implementing more advanced IVR applications integrated with emerging technologies. One such technology that continues to gain massive popularity is Location Based Services. By integrating Location Based Services with your IVR applications, one can open a wealth of revenue generating opportunities for their organization. The following paper will explore some of the many uses for location enhanced applications in the market today and how incorporating these solutions into your network can help lower your costs and provide a richer, more valuable experience for your end users.

2 Introduction

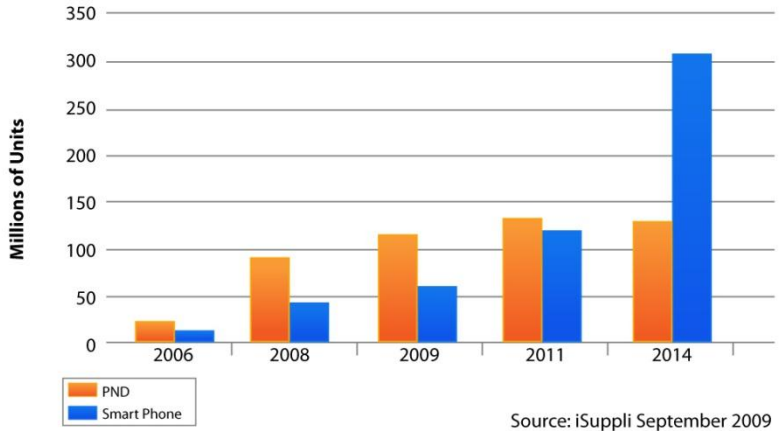
Location based services have been around for many years in one form or another. The advent of location based services has allowed Interactive Voice Response systems (IVRs) the ability to pull location information from a database based upon some caller input or Caller ID. Technology evolved several years ago to allow wireless carriers to be able to use cellular tower triangulation to determine the more precise location of the caller. In fact, in the US, the Federal Communications Commission (FCC) mandated in the late 1990's that for public safety purposes, carriers must be able to provide location information of the caller to an accuracy within 50-300 meters, in order to identify the caller's location. The FCC gave phone manufacturers, service providers and Public Safety Answering Points (PSAPs) until the end of 2005 to comply with this ruling. This is one of the reasons most new telephones have GPS receivers built in.

Because of the potentially significant capital costs in complying with the federal mandate, wireless carriers are looking to add commercial applications to provide a return on their investment in infrastructure. In addition to wireless carriers, location based services can be utilized virtually anywhere that IVR technology is used, expanding and enhancing existing IVR applications or providing new services.

Now with GPS capability on virtually every phone manufactured since 2005, the opportunities for location enhanced services and smart phone applications are endless. ABI Research predicts that location based services will generate about $2.6 billion this year in revenue and more than $14 billion in 2014.

Worldwide Forecast of PNDs and GPS-Enabled Smart Phones in Use (Millions of Units)

	2006	2008	2009	2011	2014
PND	20,5	86,5	114	130	128
Smart Phone	11,3	39	57,8	117	305



Source: iSuppli September 2009

Currently, two-thirds of all smartphone owners check in with a location based app at least once a week. And let's not forget those in the world that are non-smartphone users. As of June 2010, feature phone owners make up a full 79 percent of all mobile phone owners. That number is even higher in countries like China and India. These users will continue to make up a large portion of the market for years to come, and will also be a major target for location based apps. IVRs will be key to introducing enhanced features to these types of phones.

When choosing an IVR vendor, it will be important to select a provider that has experience and capabilities to integrate these advanced technologies, so it can be done efficiently and cost effectively.

2.1 What are Location Based Services?

A Location Based Service is exactly what it sounds like...it's providing or enhancing a service using location information, typically latitude and longitude coordinates, of the caller. This can include web applications enhanced with mapping capabilities, demographic studies, location based marketing ventures, locating a business or finding a point near the caller. A big plus is that mobile users don't have to manually specify ZIP codes or other location identifiers to use location-based services. Location information is now commonly available over the network obtained either via cellular tower triangulation, Global Positioning System (GPS), or a combination of the two (enhanced GPS). GPS is becoming common as nearly all mobile phones manufactured since 2005 have some GPS communication capabilities.

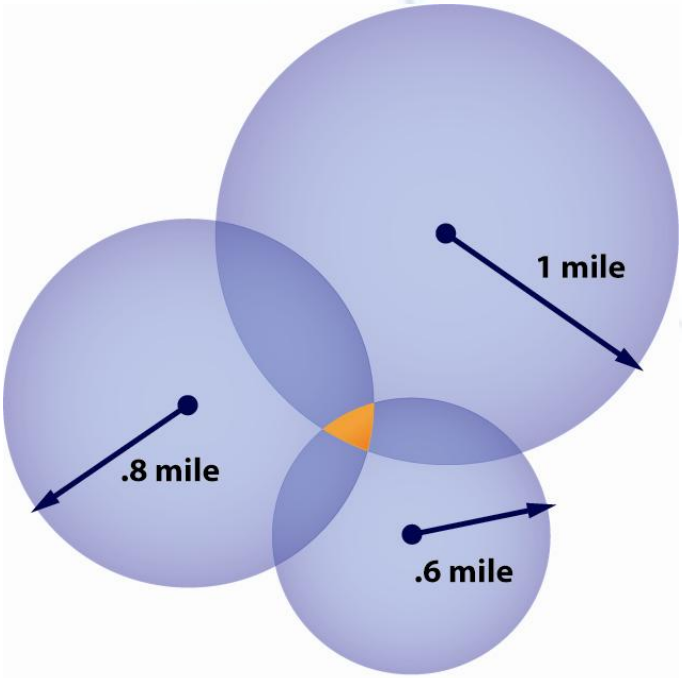
These location coordinates can then be used to access information available via GIS (Geographic Information System). Information such as nearby businesses, speed limits, nearby attractions, etc., can all be valuable information utilized by the application to enhance the service. There are several ways to incorporate GIS information. Some businesses have their own GIS infrastructure. By merging web mapping services with existing GIS infrastructure, organizations can create best of breed web map applications, extend GIS investments, and deliver more value both internally and externally. It can be difficult, however, to manage this information and keep it current and up to date.

There are many different licensing models available for various mapping products and GIS data. One option is an on-premise solution which requires purchasing the data and keeping it up to date. Alternatives include subscribing to a service and/or using APIs provided by a third party to access a hosted solution for the GIS data and mapping details.

3 A Little About Triangulation and GPS

Cell Tower Triangulation

A cell phone's location can be determined based upon its distance from one or more cell towers. In a best-case-scenario, a cell phone's signal may be picked up by three or more cell towers, enabling the "triangulation" to work. From a geometric standpoint, if you have the distance to an item from each of three distinct points, you can compute the approximate location of that item in relation to the three reference points. This geometric calculation applies in the case of cell phones, since we know the locations of the cell towers which receive the phone's signal, and we can estimate the distance of the phone from each of those antennae towers, based upon the lag time between when the tower sends a ping to the phone and receives the answering ping back.



Triangulation - cell phone detected within a certain radius of each of 3 cell towers - the area where each cell tower overlaps the phones is where it is pinpointed.

In many cases, there may actually be more than three cell towers receiving a phone's signal, allowing for even greater degrees of accuracy. In densely developed, urban areas, the accuracy of cell phone pinpointing is considered to be very high because there are typically more cell towers with their signal coverage areas overlapping.

Global Positioning System (GPS)

Nearly all new cell phones sold in America have some GPS receiving capability built in. Like a cell phone, a GPS receiver relies on radio waves. But instead of using towers on the ground, it communicates with satellites that orbit the Earth. There are currently 27 GPS satellites in orbit -- 24 are in active use and 3 act as a backup in case another satellite fails.

In order to determine your location, a GPS receiver has to determine:

- The locations of at least three satellites above you
- Where you are in relation to those satellites

The receiver then uses **trilateration** to determine your exact location. Data from a single satellite narrows position down to a large area of the earth's surface. Adding data from a second satellite narrows position down to the region where two spheres overlap. Adding data from a third satellite provides relatively accurate position. Data from a fourth satellite (or more) enhances precision and also the ability to determine accurate elevation or altitude. GPS receivers routinely track 4 to 7 or more satellites simultaneously.

A GPS receiver has to have a clear line of sight to the satellite to operate effectively, so dense tree cover and buildings can keep it from getting a fix on your location.

Wireless-assisted GPS (Enhanced GPS)

Some GPS phones use wireless-assisted GPS to determine the user's location. In wireless-assisted systems, the phone uses the orbiting GPS satellites in conjunction with information about the cell phone's signal. Sometimes called enhanced GPS, wireless-assisted GPS can often get a fix on the user's location faster than a GPS-only receiver. Some wireless-assisted systems can work inside buildings, under dense foliage and in city areas where traditional receivers cannot receive signals.

3.1 How can LBS be Leveraged to Create Revenue and Market Driven Applications?

There are many uses for Location Based services paired with IVR technology. Location based smartphone apps are starting to explode in popularity. GPS technology has made every smartphone a hand-held tracking device. IVR technology isn't just about getting information from the caller and providing information back to a caller anymore. With the ability for wireless providers to provide precise location information, IVRs can utilize the location coordinates (latitude/longitude) to integrate with mapping applications to provide maps to call center attendants or emergency dispatchers or to provide discounts to callers based on "Home Zones". Time and Attendance applications can be enhanced, house arrest/parolee tracking applications become possible, as well as targeted marketing applications are just a few of the many possibilities. The marketing possibilities are endless when you consider the ability to target a specific person in a specific place. Consider the following... I've opted in to a service provided by a certain retail store. Next time I'm in the mall, walking near the store, I receive a text or email encouraging me to come in to get my 15% discount today. What a great way to connect with your customers!

This allows for not just basic call handling as IVRs are traditionally used, but also an increase in the end user experience and allows for higher functionality of your IVR application as you provide advanced services and lower costs.

4 User Story – House Arrest / Parolee Tracking

Not everyone in this great world is honest and trustworthy, right? Thus the need for jails, rehab programs, justice systems. So, our jails are full and sometimes the bad guys have to be put back on the street while they await trial. How about a way to track a person that is on house arrest, or a person out on bail who is not to leave the area and is required to "check in" with authorities regularly? An IVR integrated with mapping and voice printing technologies can confidently pin-point that person's location when they call in, verify they are who they say they are, and provide the operator/authority a map showing their precise location. This saves time and money for resources that may previously have had to do home visits.

5 User Story – Enhanced Call Center / Dispatch

A similar scenario is enhancing call center operations, or emergency dispatch operations with IVR technology integrated with mapping. A call comes in to the dispatch/call center. The operator on duty will get a visual representation of the caller's location, as well as the location of where the emergency is taking place. In some developing countries, there are concerns about the criminal element calling in a fake emergency to distract the fire/police resources. So, while police are hurrying to point A to rush to someone's aid, the thieves are now clear to pull off the burglary at point B. Cold and calculated, yes, but it's a real concern in some countries/areas. A call center that's enabled with mapping technologies will allow these dispatchers to see that the caller is not in the location they say they are. More validation can be done before dispatching services.

6 User Story – Enhanced Time and Attendance Tracking

Many businesses with mobile workers experience a disconnect between management and worker activity. This can oftentimes lead to human error when reporting job site attendance as well as increase payroll errors. How about a mobile app or an IVR app providing real-time visibility for employers that employees call in to their location is logged automatically from the information provided through the network, or through the application. If they want them to call in to a live person, that person could have the ability to see on the map interface which site that person is calling from. So, "Hey, it's Jim, I'm just arriving at apartment 4 to do the maintenance work". Jim's supervisor can see on the map that Jim is at Apt. 4 and the right location, and his time can be tracked in the system and accounted to the job.

7 Summary / Custom IVR Applications

Optimizing the caller experience requires IVR logic and operator-assisted work flows designed with a thorough understanding of the scope and availability of location information. A good design that leverages the value from caller location and handles the exceptions effectively can yield substantial enterprise and customer benefits.

Interact Incorporated's Custom IVR Applications go beyond the traditional IVR functionalities by integrating new and advanced technology to provide customized applications to help streamline operations for virtually any industry. Our services are designed to help global partners reduce communications costs and provide a one-stop solution for IVR, SMS, geo-location, ASR, and other advanced features, by pulling all these technologies together. Our solutions can be deployed as a stand-alone solution or can be integrated with existing infrastructures.

"Logic will get you from A to B. Imagination will take you everywhere." – Albert Einstein

Let Interact take you from an idea, to full implementation. The opportunities for new and innovative ideas utilizing location based services and other advanced technologies are endless.

In choosing an IVR for your enterprise applications or call center, it is critical to choose a provider who is familiar with integrating IVR with these advanced technologies such as geo-location, mapping, ASR/TTS and voice biometrics, to allow you to provide more value, reduce your costs, and to "future-proof" your investment. Use your imagination, dream with us. Technologies change quickly. Choose an IVR vender that can grow with you, help you build your vision, and take your investment into the future.